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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,202	03/31/2006	Masato Kobayakawa	Q77895	8948
23373 7590 06/15/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
			EXAMINER VALENTINE, JAMI M	
			ART UNIT 2815	PAPER NUMBER
			MAIL DATE 06/15/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/574,202

Applicant(s)

KOBAYAKAWA ET AL.

Examiner

Jami M. Valentine, Ph.D.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2006 is/are: a) ☒ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 3/31/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Status of the Application***

1. **Claims 1-30** are pending in this application.

### ***US National Phase of PCT***

2. Acknowledgment is made that this application is the US national phase of international application PCT/JP04/14873 filed 1 October 2004 which designated the U.S. and claims benefit of US Provisional application No 60/509,997 and JP 2003-344599, filed 2 October 2003.

### ***Foreign Priority***

3. Acknowledgment is made that the certified copy of the foreign priority document has been received in the national stage application from the International Bureau.

### ***Information Disclosure Statement***

4. Acknowledgment is made that the information disclosure statement has been received and considered by the examiner. If the applicant is aware of any prior art or any other co-pending applications not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

### ***Drawings***

5. There are no objections or rejections to the drawings.

### ***Specification***

6. The abstract of the disclosure is objected to because it has too many words. The abstract must contain 50 –150 words. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claims 16 and 17** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Per **Claim 16**, the following language is indefinite: "...wherein a layer containing said n-type dopant and an undoped layer are stacked alternately." Since only two layers are recited, it is not clear what is meant by "stacked alternately."

10. Per **Claim 17**, the following language is indefinite: "...wherein a higher layer at the concentration of said n-type dopant is not thicker than a lower layer." It is unclear what is meant by this limitation. In order to provide an examination in view of the existing prior art, the limitation is interpreted as. "...wherein a layer with a higher concentration of said n-type dopant is not thicker than a layer with a lower concentration of said n-type dopant." Further, since there are multiple layers, it is impossible to discern which layer to apply this limitation.

***Claim Objections***

11. Claims 13 and 14 are objected to because of the following informalities: Grammatical errors. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. **Claims 1-12, 15-17, 19-21 and 23-29** are rejected under 35 U.S.C. 102(b) as being anticipated by Hidemi et al. (Japanese Patent Application Publication No 2002/043618) hereinafter referred to as Horii.

14. Per **Claim 1** Hidemi (e.g. figure 1) discloses a nitride semiconductor device, comprising

- an n-type layer (3), a light-emitting layer (4)-(10), and a p-type layer (11) which are formed of a nitride semiconductor and sequentially stacked on a substrate in the above order, (see figure 1, and [0027]).
- said light-emitting layer having a quantum well structure in which a well layer (5), (7) and (9) is sandwiched by barrier layers (4), (6), (8) and (10) having band gaps wider than the band gap of the well layer, [0013]
- wherein each barrier layer comprises a barrier sublayer C which has been grown at a temperature higher than a growth temperature of said well layer, and a barrier sublayer E which has been grown at a temperature lower than a growth temperature of said barrier sublayer C, and said barrier sublayer C is disposed closer to said substrate with respect to said barrier sublayer E

15. Further, claim 1 recites "product-by-process" limitations. While product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. In re Hirao, 190 USPQ 15 at 17(footnote 3). The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the

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prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) See also *in re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 116 *in re Wertheim*, 191 USPQ 90 (209 USPQ 254 does not deal with this issue); and *In re Marosi et al*, 218 USPQ 289 final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear.

16. Per **Claim 2**, Hidemi [0033] discloses the device of claim 1, including where the nitride semiconductor is represented by formula  $\text{In}_x\text{Al}_y\text{Ga}_{1-x-y}\text{N}$  ( $0 \leq x < 1$ ,  $0 \leq y < 1$ ,  $0 \leq x + y < 1$ ).

17. Per **Claims 3-9**, Hidemi discloses the device of claim 1, including barrier layers and barrier sublayers. Claims 3-9 recite "product-by-process" limitations. While product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Hirao*, 190 USPQ 15 at 17(footnote 3). The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) See also *in re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 116 *in re Wertheim*, 191 USPQ 90 (209 USPQ 254 does not deal with this issue); and *In re Marosi et al*, 218 USPQ 289 final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or

not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear.

18. Per **Claim 10**, Hidemi discloses the device of claim 2, including where said well layer comprises GaInN. [0028]

19. Per **Claim 11**, Hidemi discloses the device of claim 2, including where said barrier layer (4) comprises GaInN or GaN. [0033]

20. Per **Claim 12**, Hidemi discloses the device of claim 1, including where at least one layer selected from said well layer and said barrier layer contains an n-type dopant. [0043]

21. Per **Claim 15**, Hidemi discloses the device of claim 12, including where a concentration of said n-type dopant in at least one layer selected from said well layer and said barrier layer varies periodically. [0033]

22. Per **Claim 16**, In so far as definite, the claim is rejected in view of the existing prior art as follows: Hidemi discloses the device of claim 15, including a layer containing said n-type dopant and an undoped layer. [0067]

23. Per **Claim 17**, In so far as definite, the claim is rejected in view of the existing prior art as follows: Hidemi discloses the device of claim 15, including where a layer with a higher concentration of said n-type dopant is not thicker than a layer with a lower concentration of said n-type dopant. [0049]

24. Per **Claim 19**, Hidemi discloses the device of claim 1, including a negative electrode provided on an n-type layer of said nitride semiconductor product and a positive electrode provided on a p-type layer of said nitride semiconductor product. (e.g. figure 1)

25. Per **Claim 20**, Hidemi discloses a light-emitting diode comprising a nitride semiconductor product according to claim 1. [0098]
26. Per **Claim 21**, Hidemi discloses a laser device comprising a nitride semiconductor product according to claim 1. [0098]
27. Per **Claim 23** Hidemi discloses a method for producing a nitride semiconductor product, said method comprising sequentially stacking on a substrate (1) a nitride semiconductor n-type layer (3), a nitride semiconductor light-emitting layer of a quantum well structure (layers (4)-(10)), and a nitride semiconductor p-type layer (11), thereby producing a nitride semiconductor product having a quantum well structure (see figure 1, and [0027]), wherein said method comprises growing a well layer; subsequently, elevating a growth temperature; growing a barrier layer of the quantum well structure at the elevated temperature, which is higher than a growth temperature of the well layer; subsequently, lowering the growth temperature; and further growing the barrier layer at the lowered temperature. [0027-0028]
28. Per **Claim 24** Hidemi discloses the method of claim 23 including growing said barrier layer before elevating the growth temperature. [0027]
29. Per **Claim 25** Hidemi discloses the method of claim 23 including growing of said barrier layer is performed in the step of elevating the growth temperature. [0027]
30. Per **Claim 26** Hidemi discloses the method of claim 23 including where said barrier layer (4) contains an n-type dopant. [0046]
31. Per **Claim 27** Hidemi discloses a method of producing a nitride semiconductor light-emitting device said method comprising a step of removing a portion of a light-emitting layer and a p-type layer of a nitride semiconductor product according to claim 1, thereby exposing an



n-type layer, a step of providing a negative electrode on the exposed n-type layer, and a step of providing a positive electrode on the p-type layer. [0088]

32. Per **Claim 28** Hidemi discloses a method for producing a light-emitting diode, comprising a step of providing a lead to a nitride semiconductor light-emitting device according to claim 19.

33. Per **Claim 29** Hidemi discloses a method including a step of providing a lead to a nitride semiconductor light-emitting device according to claim 19. This limitation is implicitly disclosed in paragraph [0098]

***Claim Rejections - 35 USC § 103***

34. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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36. **Claims 13-14 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidemi.

37. Per **Claims 13 and 14** Hidemi teaches the device of claim 12, but fails to teach where the said n-type dopant is Si or Ge.

38. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Si or Ge as the dopant, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for its intended use as a matter of design choice. *In re Leshin*, 125 USPQ 416.

39. Per **Claim 18** Hidemi teaches the device of claim 12, but fails to teach where the layer containing said n-type dopant has an n-type dopant concentration of  $1 \times 10^{16}$  to  $5 \times 10^{19} \text{cm}^{-3}$

40. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a material with an n-type dopant concentration of  $1 \times 10^{16}$  to  $5 \times 10^{19} \text{cm}^{-3}$ , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for its intended use as a matter of design choice. *In re Leshin*, 125 USPQ 416.

41. **Claims 22 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hidemi in view of Shimizu et al. (US Patent Application Publication No 2002/0070681), hereinafter referred to as Shimizu.

42. Per **Claim 22** Hidemi discloses the device of claim 1, but fails to teach a lamp.

43. Shimizu teaches with a semiconductor light-emitting device. (Figure 1 and [0053])

44. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lamp as taught by Shimizu with the nitride semiconductor light-

emitting device of to claim 1 taught by Hidemi in order to provide an LED lamp with good color reproducibility and high luminous efficacy (Shimizu [0007])

45. Per **Claim 30**, Hidemi discloses the device of claim 19, but fails to teach a method for producing a lamp, comprising a step of providing a cover containing a phosphor to a nitride semiconductor light-emitting device according to claim 19.

46. Shimizu teaches a lamp produced by a method including the step of providing a cover containing a phosphor to a semiconductor light-emitting device. (Figure 1 and [0053])

47. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lamp produced by a method including the step of providing a cover containing a phosphor as taught by Shimizu to the nitride semiconductor light-emitting device according to claim 19 taught by Hidemi in order to provide an LED lamp with good color reproducibility and high luminous efficacy (Shimizu [0007])

#### *Cited Prior Art*

48. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reference 1: US Patent Application Publication No 5,926,726 by Bour et al.

#### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jami M. Valentine, Ph.D. whose telephone number is (571) 272-9786. The examiner can normally be reached on Mon-Thurs 8:30am-7pm EST. **NOTE:** From

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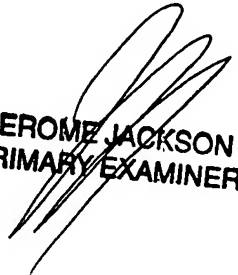
June 18 through August 8<sup>th</sup>, The examiner will be available *only* on Thursdays and Fridays 8:30am-7pm EDT, due to jury duty service.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jami M Valentine, Ph.D.  
Examiner  
Art Unit 2815

JMV

  
JEROME JACKSON  
PRIMARY EXAMINER